

REMARKS

The following Amendment is submitted in response to the Office Action dated May 3, 2004 and as a follow up to the personal interview conducted with the Examiner on August 12, 2004. In the Office Action, the Examiner objected to the specification for claiming benefit to U.S. Patent Application 60/314,580 filed 08/23/2000 because the U.S. Patent Application 60/314,580 was filed 08/23/2001. The Examiner objected to the abstract of the disclosure because the phrase "some embodiments provide..." does not specifically describe the invention. The Examiner also objected to claims 27, 41, and 50 for using the terms "threshold value."

In addition, the Examiner rejected claims 27, 29-31, 40-41, 44 and 50-53 under 35 U.S.C. § 102(b) as being anticipated by a paper entitled "Timing-Driven Hierarchical Global Routing with Wire-Sizing and Buffer-Insertion for VLSI with Multi-Routing-Layer", IEEE, Jan. 25-28, 2000, pp. 99-104 to Deguchi, et al. ("Deguchi"). The Examiner rejected claims 45-49 under 35 U.S.C § 103(a) as being unpatentable over Deguchi in view of a paper entitled "Channel Routing in Manhattan-Diagonal Model", IEEE, Jan. 1996, pp.43-48 to Das, et al. ("Das"). The Examiner objected to claims 32-39 and 54-57 as being dependent upon a rejected base claim, but the Examiner stated that claims 32-39 and 54-57 were otherwise allowable if rewritten in independent form. The Examiner allowed claims 42-43 over the prior art.

Applicants have amended claims 27, 29, 32, 35, 38-39, 42, 50-51 and 54-57. However, Applicants have not added or canceled any claims. Accordingly, claims 27 and 29-57 will be pending in the application.

I. Interview with the Examiner / Statement of Substance of the Interview

Applicants respectfully thank the Examiner for the personal interview on August 12, 2004. During the personal interview, no exhibit was shown or demonstration conducted. Applicants' representative discussed Claims 27, 41 and 50 with the Examiner. Furthermore, Applicants' representative discussed Deguchi with the Examiner. Moreover, Applicants' representative presented to the Examiner that the threshold value is a threshold combined capacity for routes to traverse along the first path and the set of paths.

II. Objection to the Specification

In the Office Action, the Examiner objected to the specification because the phrase "... serial number 60/314,580, and filed on 08/23/2000 ..." should be "... serial number 60/314,580, and filed on 08/23/2001..." Applicants respectfully submit that Applicants have previously amended this phrase in the specification by Preliminary Amendment filed December 23, 2002. A copy of the Preliminary Amendment filed on December 23, 2002 is attached, which shows this correction in the paragraph entitled Claim of Benefit to Prior Applications. A copy of the Return Receipt Post Card for this Preliminary Amendment filed on December 23, 2002 is also attached. The Return Receipt Post Card is stamped December 30, 2002.

The Examiner also objected to the abstract of the disclosure because the phrase "some embodiments provide..." does not specifically describe the invention. Applicants have amended the abstract to specifically describe the invention. Accordingly, Applicants respectfully submit that the abstract is now in compliance.

III. Objection to Claims 27, 41 and 50

The Examiner objected to claims 27, 41, and 50 for using the term "threshold value" for indefiniteness. Applicants respectfully note that claim 41 does not recite the terms "threshold value", "threshold" or "value". Thus, Applicants respectfully request reconsideration and withdrawal of the objection to claim 41.

Applicants have amended claims 27 and 50 to recite a threshold combined capacity for routes to traverse along the first path and the set of paths. Accordingly, Applicants respectfully submit that claims 27 and 50 are no longer indefinite. Thus, Applicants respectfully request reconsideration and withdrawal of the objection to claims 27 and 50.

IV. Rejection of Claims 27, 29-31 and 40 under § 102(b)

The Examiner rejected claims 27, 29-31 and 40 under § 102(b) as being anticipated by Deguchi. Claims 29-31 and 40 are dependent directly or indirectly on independent claim 27. Claim 27 recites a routing method that identifies a route for a net by using a first path within the region. The first path shares a common region in the IC region with a set of adjacent paths. The set has at least one path and each path in the set is adjacent to the first path. This routing method determines whether embedding the route in the region will cause congestion, about the first path and the set of paths, to exceed a threshold combined capacity for routes to traverse along the first path and the set of paths. This routing method embeds the route for the net based at least partially on a determination that embedding the route in the region will not cause congestion, about the

first path and the set of paths to exceed the threshold combined capacity for routes to traverse along the first path and the set of paths.

Applicants respectfully submit that Deguchi does not disclose, teach, or even suggest such a method. For instance, Applicants respectfully submit that Deguchi does not disclose, teach, or even suggest a method that routes a net within a region of an IC layout by:

- identifying a route for a net that uses a first path within the region, where the first path shares a common region in the IC region with a set of adjacent paths, and where the set has at least one path and each path in the set is adjacent to the first path;
- determining whether embedding the route in the region will cause congestion, about the first path and the set of paths to exceed a threshold combined capacity for routes to traverse along the first path and the set of paths; and
- embedding the route for the net based at least partially on a determination that embedding the route in the region will not cause congestion about the first path and the set of paths to exceed the threshold combined capacity for routes to traverse along the first path and the set of paths.

Instead, Deguchi describes an edge with a routing capacity, where the routing capacity has a constraint on the number of nets that can be routed through that single edge. See Deguchi Section II.B at page 100. In contrast, claim 27 recites in part, a method

that determines whether embedding the route in the region will cause congestion about the first path and the set of paths to exceed a threshold combined capacity for routes to traverse along the first path and the set of paths. Deguchi does not describe or suggest such a limitation, as recited in claim 27.

Accordingly, Applicants respectfully submit that Deguchi does not render claim 27 unpatentable. As claims 29-31 and 40 are dependent on claim 27, Applicants respectfully submit that claims 29-31 and 40 are patentable over Deguchi for at least the reasons that were discussed above for claim 27.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the § 102(b) rejection of claims 27, 29-31 and 40.

V. Rejection of Claims 41 and 44-49 under §§ 102(b) and 103(a)

The Examiner rejected claims 41 and 44 § 102(b) as being anticipated by Deguchi. The Examiner also rejected claims 45-49 under § 103(a) as being unpatentable over Deguchi in view of Das. Claims 44-49 are dependent directly or indirectly on independent claim 41. Claim 41 recites a routing method that partitions the IC region into several of sub-regions. Several paths exist between the sub-regions. Each path represents several routing tracks. At least a first path shares routing tracks with a set of paths. For a net, the method identifies a route that uses the first path. The method determines whether embedding the route will cause congestion, along the first path and the set of paths, to exceed the number of tracks available along the first path and the set of paths. The method embeds the route for the net based at least partially on a determination that

embedding the route will not cause the congestion, along the first path and the set of paths, to exceed the number of tracks available along the first path and the set of paths.

Applicants respectfully submit that Deguchi does not disclose, teach, or even suggest such a method. As discussed above, Deguchi describes an edge with a routing capacity, where the routing capacity has a constraint on the number of nets that can be routed through that single edge. See Deguchi Section II.B at page 100. In contrast, claim 41 recites a method that determines whether embedding the route in the region will cause congestion along the first path and the set of paths to exceed the number of tracks available along the first path and the set of paths. Deguchi does not describe such a limitation, as recited in claim 41.

Accordingly, Applicants respectfully submit that Deguchi does not render claim 41 unpatentable. As claims 44-49 are dependent on claim 41, Applicants respectfully submit that Deguchi does not anticipate or otherwise render these claims unpatentable for at least the reasons that were discussed above for claim 41.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the § 102(b) rejection of claims 41 and 44 and the § 103(a) rejection of claims 45-49.

VI. Rejection of Claims 50-53 under § 102(b)

The Examiner rejected claims 50-53 under § 102(b) as being anticipated by Deguchi. Claims 51-53 are directly or indirectly dependent on independent claim 50. Claim 50 recites a computer readable medium that has a computer program for routing a

net within a region of an IC layout. The computer program has a first set of instructions that identifies a route for the net. The route uses a first path within the region. The first path shares a common region in the IC region with a set of adjacent paths, where the set has at least one path and each path in the set is adjacent to the first path. The computer program includes a second set of instructions that determines whether embedding the route in the region will cause congestion, about the first path and the set of paths, to exceed a threshold combined capacity for routes to traverse along the first path and the set of paths. The computer program also has a third set of instructions that embeds the route for the net based at least partially on a determination that embedding the route in the region will not cause congestion, about the first path and the set of paths, to exceed the threshold combined capacity for routes to traverse along the first path and the set of paths.

Applicants respectfully submit that Deguchi does not disclose, teach, or even suggest such a computer readable medium. As discussed above, Deguchi describes an edge with a routing capacity, where the routing capacity has a constraint on the number of nets that can be routed through that single edge. See Deguchi Section II.B at page 100. In contrast, claim 50 recites in part, a second set of instructions that determines whether embedding the route in the region will cause congestion about the first path and the set of paths to exceed a threshold combined capacity for routes to traverse along the first path and the set of paths. Deguchi does not disclose, teach, or even suggest such a limitation, as recited in claim 50.

Accordingly, Applicants respectfully submit that Deguchi does not render claim 50 unpatentable. As claims 51-53 are dependent on claim 50, Applicants respectfully submit that claims 51-53 are patentable over Deguchi for at least the reasons that were discussed above for claim 50.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the § 102 rejections of claims 50-53.

VII. Allowable Claims 32-39 and 54-57

The Examiner objected to claims 32-39 and 54-57 as being dependent upon a rejected base claim. The Examiner stated that these claims would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. However, Applicants respectfully have not rewritten any of these claims in independent form since Applicants respectfully believe that the rejected independent claims 27 and 50 are patentable over the cited reference.

In view of the foregoing, Applicants respectfully request reconsideration of allowable dependent claims 32-39 and 54-57.

VIII. Allowable Claims 42-43

Claims 42-43 were allowed over the prior art. Applicants respectfully thank the Examiner for the allowance.

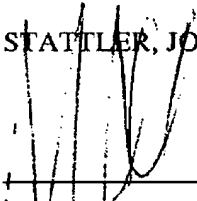
CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 27 and 29-57, are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

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